

sumption does not cost more than some seven-eighths of a penny per horse-power per hour.

"It is admitted that non-condensing steam engines may be worked with five lb. coal per indicated horse-power per hour, at a cost of one half penny; still there are other savings to the credit of gas engines, which would balance the difference of cost.

"Engines are now being made to develop 50 horse-power, and when used on a large scale, so that it would pay to have an attendant devoting his whole time, there is no need to work them with illuminating gas from the street main, they can be driven by home-made gas, on the Davison system, and when worked in this way 1½ lbs. of 'culm' will give one horse-power, and one led is sufficient to manage a gas-producing apparatus adequate to provide for engines of 300 indicated horse-power."

At the head of their disadvantages stands their first cost, which is more than double that of steam engines; indeed, it may be taken that their cost is about equal to a steam engine, boiler, and chimney combined. This arises in a great measure from the intricate and elaborate character of their mechanism and to the royalty of patent rights over their various parts.

A further detail under this head is the unsteady or irregular character of the power evolved. They are supplied with ample fly-wheel power, and very sensitive governors for regulating the supply of gas; but, nevertheless, they are wanting in regularity when compared with the steam engine, a detail that arises out of the intermittent character of the force employed. There are some makers of engines who claim to obtain power by a vacuum following the explosion, but is not claimed that it is of equal force with the explosion itself, although it is claimed that its action causes nearly as much power to be obtained as if the ignition took place every stroke, instead of, as is generally the case, every second stroke.

Gas engines are objected to on the score of the cost of the gas they consume. This is so marked an objection, where continuous power for 10 or 12 hours a day is required, that no one will venture upon a gas motor where steam can be by any possibility be used. This is so intensified where large engines are required that in practice the motor is nearly wholly used on small powers. As we write we notice the circular of one maker, who says, "any size of engine from 1½-horse up to 16 horse can be supplied." This make draws his limit at 16-horse; but in practice the engines he turns out are nearly all small powers. Users of motive-power on the large scale, unless some special object exists, pin their faith upon steam.

There is an objection to gas engines arising out of their difficulty of starting, and their liability to revolve the wrong way round, from which considerable damage may arise. Improvements have been made in the ignitors and the valve arrangements, by which immaturity from this evil is claimed.

Another objection arises from the number and size of the slides, and their liability to get out of order and allow the gas to escape. To keep this insidious vapor intact, the working parts are highly saturated with oil, which combining with the carbon or residue of combustion sets up a wearing action practically unknown to the steam engine.

The attention of inventors is closely turned upon this point or detail, and those who maintain that the engine of the immediate future will be constructed without slides, and only one valve to take in air and gas to let out combusting.

A further objection arises from the hard and fast character of their computation of power. Gas engines give out very little more than their nominal reputed power, whilst a well-designed or made steam engine will indicate three times its reputed or nominal power.

As we write we are reminded of a case where a 3½ horse power gas engine was put down 9 or 10 months ago. It is said to be doing the work of a 6-horse engine, but the owner is trying to effect a sale at two-thirds its original cost. He states, on the one hand, that he requires more power, and, on the other, that he wants steam for heating purposes; but there can be little doubt that the hard and fast character of its

nominal reputed power is the main cause of the wished for change.

As we write the position of the gas engine, as a light or occasional power is required, is well secured, and having won this position, and being admittedly in its infancy, there is great future before it. It is an undoubted fact that by compressing the compound from which the motion is obtained, and associating therewith the power of the vacuum, a motor of no mean order is obtained. As with all new machinery, there is a wide field for improvement, one to which many practical engineers are devoting their best attention, and hence we must not be surprised if in a few years it is improved up to the level of the steam engine, and is successfully applied to the large powers as well as to the small powers. It is an old saying that "the world was not built in a day;" but it is a fact that the progress made by the gas engine as a motor during the last twelve years is without parallel in this century of mechanical invention. —*Timber Trades Journal.*

The Inventors' Exhibition.

LONDON, May 4. — The Inventors' Exhibition has been put in as fair a state of completeness as possible for the inspection of the Royal party. The most extensive exhibits seem to be in implements of war, of which there is a remarkable display. The show of appliances of electricity is excellent. The Court assigned to America is not more than a third applied for, and is compelled to be filled by English exhibitors. Much disappointment on this account is expressed, but this is largely explained by the fact that America's inventions are seen in all parts of the exhibition. The Russian Court, adjoining, contains nothing but scores of unpacked cases. The buildings were crowded at the opening. The Prince of Wales was received without cheers though much enthusiasm was expected after his return from Ireland. The Princess of Wales the Duke of Edinburgh, and Duke of Cambridge Lord Granville and Sir William Vernon Harcourt were amongst the distinguished persons present. The audience was very large.

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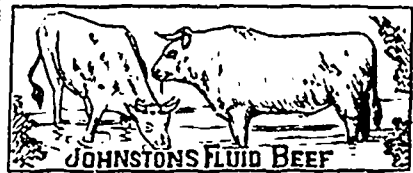
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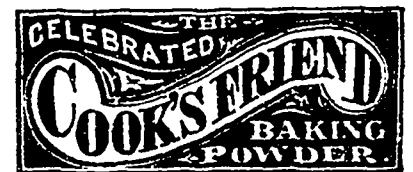
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